

TABLE 12-1
Screening of Preliminary Remedial Alternatives

Alternative Array	Components	Effectiveness	Implementability	Relative Cost	Retained or Screened Out?
Alternative 1	No action	This alternative would not be effective at meeting RAOs.	Implementable.	Capital: None O&M: None	Retained to provide a baseline for detailed evaluation of the other remedial alternatives.
Alternative 2	Institutional Controls Containment Cell O&M Monitored Natural Attenuation (MNA)	This alternative cannot be effective at meeting RAOs for soil, waste, and leachate because it does not include engineered covers. However, it can meet RAOs for soil vapor and groundwater.	Implementable.	Capital: Low O&M: Low	Retained for detailed evaluation.
Alternative 3	Institutional Controls, Containment Cell O&M, MNA Utility Relocation, Pooled DNAPL Recovery at BR-I Capping Sites G, H, I South, and L	This alternative can be effective at meeting the RAOs for soil, waste, and leachate, although using soil or crushed rock covers would be equally effective and less expensive. This alternative meets the soil vapor and groundwater RAOs. The RCRA Subtitle C caps would not significantly reduce the time to clean for groundwater.	RCRA Subtitle C caps are implementable at Sites G and H but difficult to implement at Site I South (see Note 1). This alternative would require large amounts of fill materials and would change the site grades significantly.	Capital: High O&M: Moderate Capital costs for RCRA Subtitle C caps are typically at least \$200K per acre and can be significantly higher.	Retained for detailed evaluation.
Alternative 4	Institutional Controls, Containment Cell O&M, MNA Utility Relocation, Pooled DNAPL Recovery at BR-I Capping Sites G, H, I South, and L Leachate Control at Sites G, H, and I South	This alternative can be effective at meeting the RAOs for soil, waste, and leachate, although using soil or crushed rock covers would be equally effective and less expensive. This alternative meets the soil vapor and groundwater RAOs. The RCRA Subtitle C caps with leachate control would not significantly reduce the time to clean for groundwater.	RCRA Subtitle C caps and leachate recovery systems (including wells and piping) are implementable at Sites G and H but difficult to implement at Site I South and disruptive to current operations (see Note 1). This alternative would require large amounts of fill materials and would change the site grades significantly.	Capital: High O&M: High Capital costs are higher compared to Alternative 3 due to installation of leachate extraction wells and leachate pre-treatment systems. Disposal of recovered leachate at the ABRTF costs approximately \$8.50 per 1000 gallons, which results in high O&M costs.	Retained for detailed evaluation.
Alternative 5	Institutional Controls, Containment Cell O&M, MNA Utility Relocation, Pooled DNAPL Recovery at BR-I Soil or Crushed Rock Covers at Sites G, H, I South and L Pulsed Air Biosparging (PABS) at Residual DNAPL Areas at Sites G, H, and I South	This alternative can be effective at meeting the RAOs for soil, waste, and leachate and meets the groundwater RAOs. The PABS systems would require relatively expensive O&M and would not achieve a 30-year time to clean for groundwater. This alternative can achieve the soil vapor RAO provided that soil vapors generated during operation of the PABS systems are carefully monitored and managed to prevent potential unacceptable risks to indoor workers in nearby buildings.	Soil or crushed rock covers and biosparging systems (including wells and piping) are implementable at Sites G and H but difficult to implement and disruptive to current operations at Site I South (see Note 1).	Capital: High O&M: High Soil or crushed rock covers are much less expensive than RCRA Subtitle C caps. However, this alternative includes significant capital costs for numerous closely spaced sparge well pairs in MHU and DHU, air compressors and extensive underground piping.	Retained for detailed evaluation.

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Alternative 6	Institutional Controls, Containment Cell O&M, MNA Utility Relocation, Pooled DNAPL Recovery at BR-I Soil or Crushed Rock Covers at Sites G, H, I South and L Air Sparging with SVE at DNAPL Areas at Sites G, H, and I South	This alternative can be effective at meeting the RAOs for soil, waste, and leachate and meets the groundwater RAOs. The air sparging and SVE systems would require relatively expensive O&M and would not achieve a 30-year time to clean for groundwater. This alternative can achieve the soil vapor RAO provided that soil vapors generated during operation of the air sparging systems are carefully monitored and managed to prevent potential unacceptable risks to indoor workers in nearby buildings.	Soil covers and air sparging / SVE systems (including wells and piping) are implementable at Sites G and H but difficult to implement and disruptive to current operations at Site I South (see Note 1).	Capital: Very High O&M: Very High Capital and O&M costs for air sparging with SVE are significantly higher compared to Alternative 5. See discussion in Appendix C.	Screened out from further consideration. This alternative is significantly more expensive than Alternative 5 and has little or no added benefit in improving time to clean for downgradient groundwater.
Alternative 7	Institutional Controls, Containment Cell O&M, MNA Utility Relocation, Pooled DNAPL Recovery at BR-I Capping Sites G, H, I South, and L Hydraulic Containment at Downgradient Boundary of Sauget Area 1 Study Area	This alternative can be effective at meeting the RAOs for soil, waste, and leachate, although using soil or crushed rock covers would be equally effective and less expensive. This alternative meets the soil vapor and groundwater RAOs. Hydraulic containment would require very expensive long term O&M and would not achieve a 30-year time to clean for groundwater.	RCRA Subtitle C caps are implementable at Sites G and H but difficult to implement at Site I South and disruptive to current operations (see Note 1). Hydraulic containment is implementable but is very expensive to operate.	Capital: Very High O&M: Very High Alternative 7 (RCRA caps and hydraulic containment) includes 5 high-capacity extraction wells with a total flowrate of 1850 gpm. The estimated O&M cost for Alternative 7 is \$5.6 million per year, and the estimated present value cost for Alternative 7, including capital costs and 30 years of operation, is \$78.9 million.	Screened out from further consideration. Alternative 5 achieves much greater source mass reduction at far less cost and does not require consumption of large quantities of electrical power and other resources to pump and treat groundwater for hundreds of years.
Alternative 8	Institutional Controls, Containment Cell O&M, MNA Utility Relocation, Pooled DNAPL Recovery at BR-I Capping Sites G, H, I South, and L Groundwater Removal at Sites G, H, and I South Hydraulic Containment at Downgradient Boundary of Sauget Area 1 Study Area	This alternative can be effective at meeting the RAOs for soil, waste, and leachate, although using soil or crushed rock covers would be equally effective and less expensive. This alternative meets the soil vapor and groundwater RAOs. Plume removal would require very expensive O&M and would not achieve a 30-year time to clean for groundwater.	RCRA Subtitle C caps are implementable at Sites G and H but difficult to implement at Site I South and disruptive to current operations (see Note 1). Plume removal is implementable but is very expensive to operate.	Capital: Very High O&M: Very High Alternative 8 (RCRA caps, groundwater extraction in source areas, and hydraulic containment) includes 8 high-capacity extraction wells with a total flowrate of 2800 gpm. The estimated O&M cost for Alternative 8 is \$8.2 million per year, and the estimated present value cost for Alternative 8, including capital costs and 30 years of operation, is \$113 million.	Screened out from further consideration. Alternative 5 achieves much greater source mass reduction at far less cost and does not require consumption of large quantities of electrical power and other resources to pump and treat groundwater for hundreds of years.

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Alternative 9	Institutional Controls, Containment Cell O&M, MNA Utility Relocation, Pooled DNAPL Recovery at BR-I Excavation and Off-Site Disposal of Wastes at Sites G, H, I South, and L	This alternative can be effective at meeting the RAOs. However, this alternative would pose significant short-term risks to site workers and the community. Site workers would have to excavate, segregate, and load large volumes of hazardous wastes. Short-term risks to the community include heavy truck traffic for a long period of time and potential for dust and COC emissions.	Very difficult to implement. This alternative would involve excavation and off-site disposal of approximately 827,000 loose cubic yards of waste / fill and backfilling a similar volume of clean imported fill. At some locations the waste extends to depths of > 30 ft below grade.	Capital: Extremely High O&M: Low Much of the waste / fill is hazardous waste and/or contains PCB and would be very expensive to dispose. Costs for excavation, transportation, and disposal could easily exceed \$1000 per ton.	Screened out from further consideration. This alternative is very expensive and very difficult to implement, and would involve significant short-term risks to workers and the community.

Notes:
1) Cerro uses Site I South and Site I North as a trailer parking and staging area. The truck traffic at this trailer parking area includes trailers of raw material entering the facility, trailers of product leaving the facility, and moves of the trailers between the trailer parking area and the main operating areas. The amount of traffic in the facility varies during the year, but the traffic levels for February 2012 are typical. During February 2012 a total of 155 raw material trailers and 227 product trailers were managed by the facility. As part of standard operations, each trailer is moved into or out of the trailer parking area a total of 4 times. Therefore, during February 2012 there were a total of 1528 moves. In February there were 22 operating days (i.e., Monday through Friday), so there were an average of 69 moves per operating day during the month. This traffic would need to be managed during construction of a RCRA Subtitle C cover at Site I South.